# 3R - 434

# RP GWMR

# JAN 2009

# Environmental Work Plan for Monitoring Well Installation, Groundwater Sampling and Preliminary Exposure Pathway Assessment (PEPA)

**Faye Burdette No. 1**
**San Juan Basin, Aztec, New Mexico**

*Prepared for:*

**ConocoPhillips Company**

*Risk Management and Remediation*
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January 2009

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## APPENDICES

# 1.0 PURPOSE AND NEED

This document presents the scope of work to be performed at the Faye Burdette No. 1 petroleum hydrocarbon release site (Site) associated with ConocoPhillips Company exploration and production operations in the San Juan Basin area of New Mexico. The surface owner of the Site is the Chaffee Family Trust.

This work is being conducted in response to a request by the New Mexico Oil Conservation Division (OCD) for Site characterization and enhanced laboratory analyses. This request was communicated to Tetra Tech Incorporated (Tetra Tech) during an April 2008 meeting conducted in Santa Fe, New Mexico with Glen Von Gonten, OCD Environmental Bureau Hydrologist. The OCD is located at 1220 South St. Francis Drive, Santa Fe, NM 87505.

This document does not describe the preparation of risk analyses or the implementation of remedial activities that could potentially occur simultaneously with monitoring efforts at the sites in the future. Specific plans covering those potential activities will be prepared separately.

# 2.0 SITE HISTORY

Chronologies of activities previously performed at the Site are presented below. The proposed scope of work for the Site is presented following the chronology section.

## 2.1 Site Activities

The following table summarizes activities that have occurred at the Site regarding the response to the 2007 release discovery.

| DATE | ACTIVITY |
|---|---|
| July 2007 | Contaminated soil excavated from the Site. Two ground water samples were obtained at the time of this excavation, and one (1) of these samples was found to contain total xylenes above the State of New Mexico drinking water standard. Original source of contamination is unknown. |
| September 26, 2007 | Ground water monitoring well installed to a depth of 15 feet below ground surface (bgs) by Envirotech Inc. of Farmington, NM (Envirotech). A soil sample obtained from the well boring was analyzed for benzene, BTEX and total petroleum hydrocarbons (TPH). Results were below NMOCD regulations of 10 parts per million (ppm), 50 ppm, and 100 ppm, respectively. |
| September 26, 2007 | A ground water sample was collected from the temporary monitoring well and analyzed for BTEX; results were below the State of New Mexico drinking water standard for this constituent. Depth to ground water recorded at 9.5 feet bgs. |
| November 2007 | Envirotech report recommends plugging and abandonment of the temporary ground water monitoring well and a no further action determination for the Site (Envirotech, 2007). |

# 3.0 SCOPE OF WORK

The Scope of Work for Site activities is described below. Work conducted at the Site will consist of field preparation prior to the start of work (Section 3.1); a Site investigation (Section 3.2) consisting of soil boring advancement and soil sample collection (Section 3.2.1); soil boring completion to groundwater monitoring wells (Section 3.2.2); proper handling and disposal of investigation-derived waste (Section 3.2.3); and groundwater monitoring (Section 3.2.4). Reporting is discussed in Section 3.3, the preliminary exposure pathway assessment (PEPA) prepared by Tetra Tech for ConocoPhillips internal use is described in Section 3.4, and quality assurance/quality control (QA/QC) is discussed in Section 4.0. References can be found in Section 5.0. Figure 1 is a Site location map, Figure 2 displays the Site layout and proposed locations of groundwater monitoring wells to be installed, and Figure 3 is a typical groundwater monitoring well completion diagram. Appendices follow the Figures and include:

- Appendix A – Historical Analytical Tables;
- Appendix B – Groundwater Monitoring Well Installation Log for MW-1;
- Appendix C – Soil Boring and Monitoring Well Completion Log Forms, MW-2 through MW-4;
- Appendix D – Groundwater Sampling Forms; and
- Appendix E – Site Contacts

## 3.1 Pre Field Work Preparation

The proposed groundwater monitoring well location map (Figure 2) will be reviewed and approved by ConocoPhillips Risk Management and Remediation personnel. Once these well locations have been approved, New Mexico One-Call will be contacted to perform a utility locate within a 250 foot radius from the Faye Burdette No. 1 wellhead. Additionally, monitoring well installation permits will be acquired by WDC Exploration and Wells of Peralta, NM (WDC), and a Health and Safety Plan (HASP) will be prepared by Tetra Tech prior to the start of field work.

## 3.2 Site Investigation

### *3.2.1 Soil Boring Advancement and Soil Sample Collection*

The subject Site is scheduled to have three (3) soil borings completed into two-inch diameter groundwater monitoring wells in order to define the groundwater flow direction and to determine the extent, if any, of petroleum hydrocarbon-impacts to groundwater. Borings will be advanced until auger refusal is met or until a sufficient depth into groundwater is achieved. Depth to groundwater at the Site is expected to be found at a depth of 9.5 feet bgs (Envirotech, 2007).

Prior to the start of drilling operations, each boring location will be "day lighted" by Riley Industrial Services of Farmington, New Mexico, in order to insure that no underground utilities within the Site will be damaged by drilling equipment. "Day lighting" of each boring will be performed using a vacuum truck and water pressure to advance a hole approximately ten (10)

inches in diameter and five (5) feet deep. Soil samples will be collected from just below the "day lighted" hole to just above the water table with a split-spoon sampling device during the advancement of each boring, while the lithology of the borehole will be recorded to the total depth of the boring. Soil samples will be collected in two-foot intervals for field screening with a photo-ionization organic vapor detector (PID) using the heated headspace method. The interval containing the highest PID readings within each of the three (3) soil borings will be collected and submitted to a laboratory for the following analytical parameters:

- Volatile Organic Compounds (VOCs), EPA Method 8260B
- Semivolatile Organic Compounds (SVOCs), EPA Method 8270C
- Total petroleum hydrocarbons (TPH), EPA Method 418.1
- Total metals, EPA Methods 6010/6020/7470A/7471A
- General chemistry (as described in 40 CFR 136.3), including alkalinity, bromide, chloride, fluoride, orthophosphate, sulfate, nitrate/nitrite, pH, specific conductance, TDS, and hardness (various methods)

After the first regularly scheduled quarterly groundwater monitoring event covered under this work plan, an expanded baseline groundwater parameter list will be submitted for laboratory analysis. Compounds of concern (COCs) detected in groundwater at concentrations above the New Mexico Water Quality Control Commission (NMWQCC) Groundwater Quality Standards during the first quarterly groundwater monitoring event will be carried forward for analyses in subsequent quarterly groundwater monitoring events. If all COCs are below NMWQCC groundwater quality standards after eight (8) consecutive quarters of groundwater monitoring, ConocoPhillips will request a No Further Action status for this Site.

The baseline parameter list for groundwater includes analyses of the following parameters:

- VOCs, EPA Method 8260B
- SVOCs, EPA Method 8270C
- TPH, gasoline range organics (GRO), EPA Method 8015B
- TPH, diesel range organics (DRO), EPA Method 8015B
- Total metals, EPA Methods 6010/6020/7470A/7471A
- General chemistry (as described in 40 CFR 136.3), including alkalinity, bromide, chloride, fluoride, orthophosphate, sulfate, nitrate/nitrite, pH, specific conductance, TDS, and hardness (various methods)

### *3.2.2 Groundwater Monitoring Well Construction*

WDC will be utilized at the drilling contractor at the Site, and drilling operations will be supervised by Tetra Tech personnel. Groundwater monitoring wells will be constructed using 2-inch diameter polyvinyl chloride casing and at least 15 feet of screen (approximately 10 feet of the screen to be installed below the water table). The installed groundwater monitoring wells will contain a filter pack to 2-feet above the top of the screen, with a sand collar above the filter pack. The annular seal will placed on top of the sand collar, followed by cement grouting to the land surface. Each well will be completed with a locking, stick-up mounted well head set in concrete (Figure 3). Traffic bollards will be installed around each groundwater monitoring well.

Following construction, the ground water monitoring wells will be developed using a surge block and bailer or purge pump, and the wells will be incorporated into a quarterly groundwater monitoring program.

### *3.2.3 Investigation Derived Waste*

All well development water will be containerized in on-Site wastewater disposal tanks. Soil cuttings will be placed on polyethylene sheeting and will be covered in the event of precipitation during field activities. Once each soil boring is complete, a representative sample of soil cuttings from each soil boring will be field screened using a PID and will be spread on-Site if the results are less than 100 ppm. In the event that soil cutting PID results are greater than 100 ppm, soil cuttings will be containerized and transported by Envirotech to the Envirotech Soil Remediation Facility (or other ConocoPhillips-approved waste disposal facility) located along Angel Peak Road, approximately 16 miles south of Bloomfield, NM.

### *3.2.4 Groundwater Monitoring*

Quarterly groundwater sampling will be conducted in January, April, July and October 2009 at the Site. A dedicated, disposable bailer will be used to purge and sample each well. A groundwater sample will be collected once depth to groundwater, specific conductance, pH, dissolved oxygen, and temperature are determined to have stabilized (within a 10% margin). Records of each sampling event will be kept on Tetra Tech ground water sampling forms and in a bound field notebook dedicated to the Site. Groundwater samples will be containerized in bottles supplied by SPL Laboratories of Houston, Texas or other ConocoPhillilps-approved laboratories. The groundwater samples will be placed on ice in a cooler under chain of custody documentation and submitted to SPL (or other ConocoPhillips-approved laboratory) for analysis. Groundwater samples will be shipped by overnight courier.

## 3.3 Reporting

Quarterly groundwater monitoring reports will be prepared for the Site. The first quarterly report will include a summary of the groundwater monitoring well installation and a brief narrative of the sampling events. In general, the quarterly reports will include the date(s) the events occurred, copies of field notes from each sampling event, copies of laboratory chain-of-custody documentation and results, laboratory quality assurance/quality control (QA/QC) documentation, tabulated groundwater elevations, soil results and groundwater concentration/elevation maps and cross sections, and a summary of key findings. Starting with the second quarterly report, the groundwater elevations and groundwater analytical results from the previous quarter(s) will be tabulated with the results from the current quarter.

An annual report will be prepared that summarizes the results of the most recent quarterly monitoring event and will include a compilation of the results of the previous monitoring events at the Site. One (1) hard copy of each quarterly monitoring report and of the annual monitoring report will be submitted to OCD.

In addition, a C-141 form (Release Notification and Corrective Action) will be completed and submitted to OCD for the Site.

## 3.4 PEPA

A preliminary exposure pathway assessment (PEPA) will be prepared for the Site using an internal ConocoPhillips Company checklist. In addition, an Environmental Data Resources (EDR) report will be generated for the Site and site reconnaissance and mapping will be conducted by Tetra Tech in the field. The PEPA document will be prepared for ConocoPhillips internal use only.

# 4.0 QUALITY ASSURANCE AND QUALITY CONTROL

A quality assurance evaluation will be conducted by the analytical laboratory on collected samples to check for accuracy, precision and reliability of each reported analyte concentration. Sample spiked-matrix batch samples will be analyzed to determine the accuracy of laboratory results. Quality assurance documentation will be provided on the laboratory report. In addition, at least one duplicate groundwater sample will be obtained during sampling activities and will be labeled with a false name and false time in order to remove any laboratory bias toward the sample. Results of the duplicate sample analysis will be reported with the groundwater results table contained in the quarterly report.

At least one field audit of investigation and sampling protocol will be conducted by the project manager during the period covered by this work plan. Variations from standard operating procedures will be documented and corrected, if necessary.

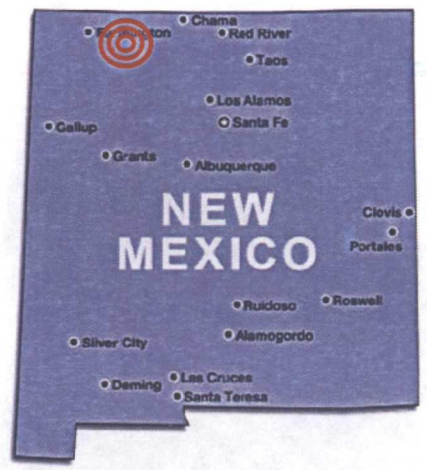
# 5.0 REFERENCES

Envirotech Inc. (2007). *Drilling and Groundwater Sampling Report at Faye Burdette No. 1, Aztec, NM.*. Prepared for ConocoPhillips. Report Dated November 2007. 22 pp.

# FIGURES


**FIGURE 1.**

Site Location Map
ConocoPhillips
Faye Burdette
Aztec, NM




Directions from HW 550 to ConocoPhillips Faye Burdette site Location

Approximate ConocoPhillips Faye Burdette Site location

N

TETRA TECH, INC.

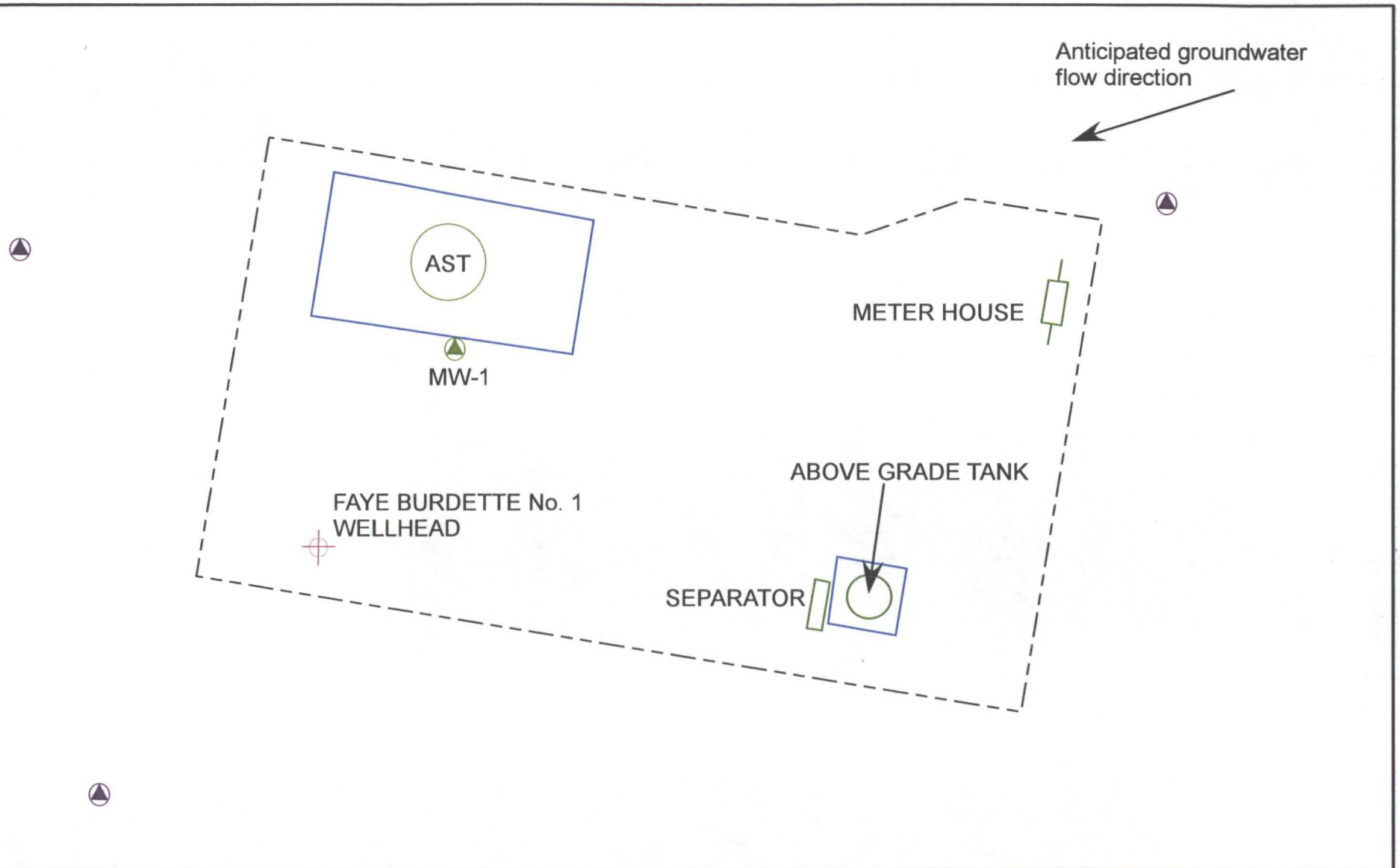



**FIGURE 2:**
**SITE LAYOUT MAP**
**CONOCOPHILLIPS**
**FAYE BURDETTE No. 1 OIL AND GAS PRODUCTION WELL**
**Sec 9, T30N, R10W**
**Aztec, New Mexico**

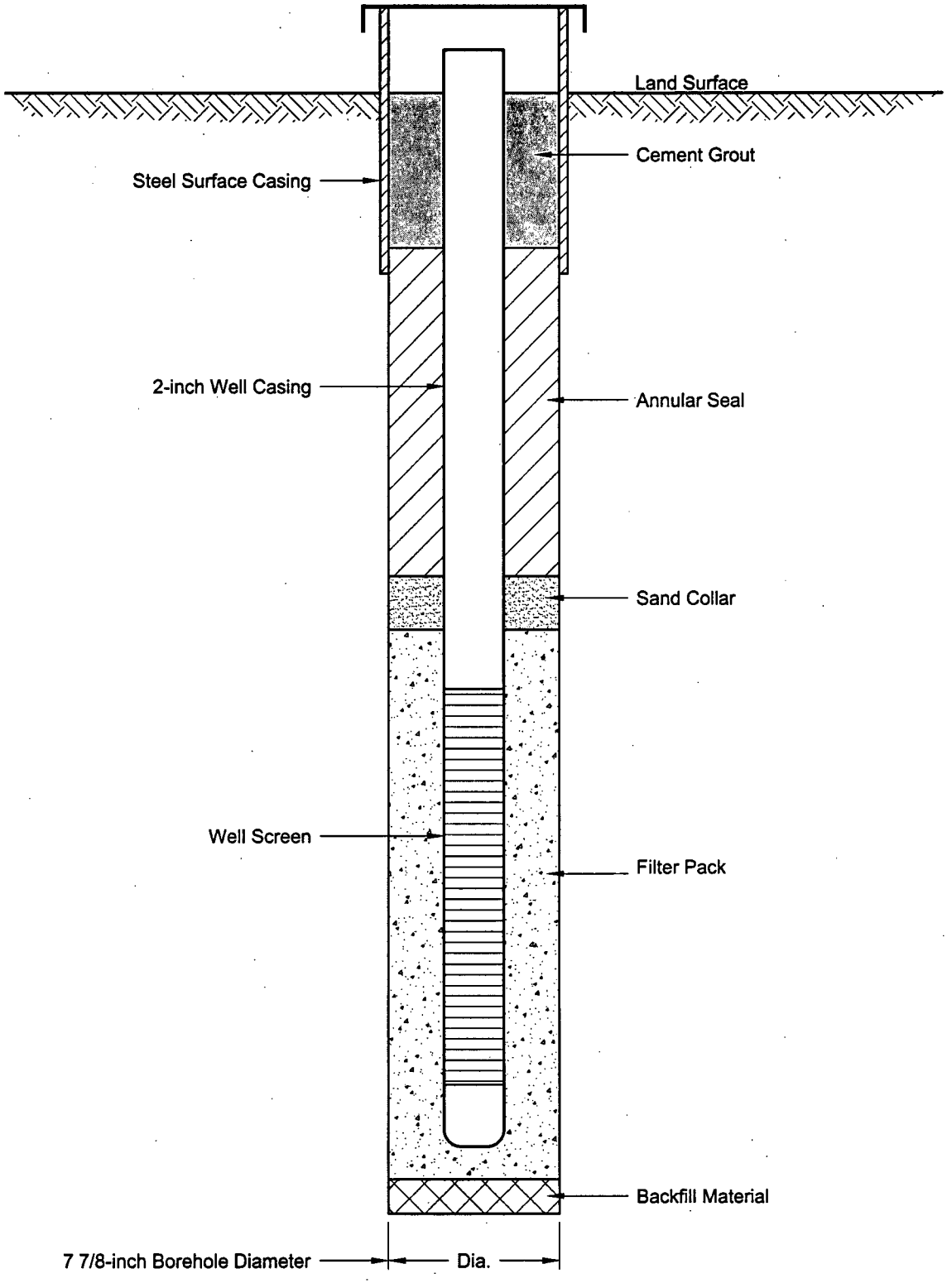
**LEGEND**

- TEMPORARY MONITORING WELL
- PROPOSED MONITORING WELL LOCATION
- BERM
- FENCE LINE
- EQUIPMENT

0 25 50
FEET

N

TETRA TECH, INC.

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December 2008

**Figure 3**
**Typical Monitoring Well Completion diagram**

# APPENDICES

# APPENDIX A
# Historical Analytical Tables

**Table 1: Summary of Analytical Results**

**Soil Sample**

| Sample ID | Date | TPH (ppm) | Benzene (ppm) | Total BTEX (ppm) |
|---|---|---|---|---|
| **NMOCD Regulations** | | **100** | **10** | **50** |
| 10' BGS | 9/26/2007 | ND | ND | 29.7 |

**Water Sample**

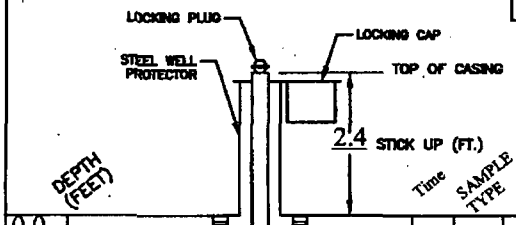
| Sample ID | Date | Benzene (ppb) | Toluene (ppb) | Ethylebenzene (ppb) | Total Xylenes (ppb) |
|---|---|---|---|---|---|
| **NMOCD/NMED Regulations** | | **10** | **750** | **750** | **620** |
| MW-1 | 9/26/2007 | ND | 0.4 | 0.8 | 2.5 |

# APPENDIX B
# Groundwater Monitoring Well Installation Log for MW-1

# ABOVE GRADE WELL COMPLETION DIAGRAM / LITHOLOGY LOG

MW 1

SB




| Time | SAMPLE TYPE | HEADSPACE (PPM) | LITHOLOGY | SAMPLE DESCRIPTION | DEPTH (FEET) |
|---|---|---|---|---|---|
| | | | | fill material, sand/silt, slightly moist, light brown, no odor | 0 |
| 1015 | NS | | | fill material, sand/silt, slightly moist, light brown, no odor | 5 |
| | | | | sand/silt, moist/wet, light brown, no odor | |
| 1020 | C | 0.6 | | WL on 9/26/07 at 1350 | 10 |
| | | | | sand/silt, dark gray/black, wet, slight odor | |
| 1025 | NS | | | | 15 |

Well Materials Used:

4.5 Sks 10–12 Silica Sand
1/2 Sks Bentonite Chips
___ Sks Class "A" Cement
___ Sks Quickcrete
10 Ft Blank Casing
5 Ft Screen

Well Development:
X Bailed
___ Pumped
15 Gallons of Water

Remarks:

DRILLER: Danny Padilla
HELPER: Robert Salazar
DRILLING COMPANY: Envirotech
DRILLING METHOD: HSA

BIT SIZE: 7 7/8"
TOTAL BORING DEPTH: 10
DATE STARTED: 9/26/07
SAMPLER TYPE: Split Spoon/Cuttings

LOCATION: Faye Burdette #1
ELEVATION:
DATE COMPLETED 9/26/07
GEOLOGIST: Greg Crabtree

Conoco Phillips
Faye Burdette No. 1
Sec 9 Twp 30N Rng 10W

ENVIROTECH INC.

ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64
FARMINGTON, NEW MEXICO 87401
(505) 632-0615

MW-1

REVISIONS
BY ___ DATE ___
BY ___ DATE ___

JOB # 96052-1031

DATE 9/27/07 DRAWN GWC
SCALE ___ APPROVED ___

PAGE 1 OF 1

# APPENDIX C
# Soil Boring and Monitoring Well Completion Log Forms, MW-2 through MW-4

TETRA TECH, INC.

PROJECT NAME
PROJECT NUMBER
LOCATION
BORING NUMBER
DATUM ELEVATION
LOGGED BY: DATE
REVIEWED BY: DATE

DRILLER DRILLING RIG
DRILLING METHOD
AUGER ID AUGER O.D.

| SAMPLING METHOD |
|---|
| |
| |

| SURFACE CONDITIONS |
|---|
| |
| |

| DRILLING | |
|---|---|
| START | FINISH |
| TIME | TIME |
| DATE | DATE |

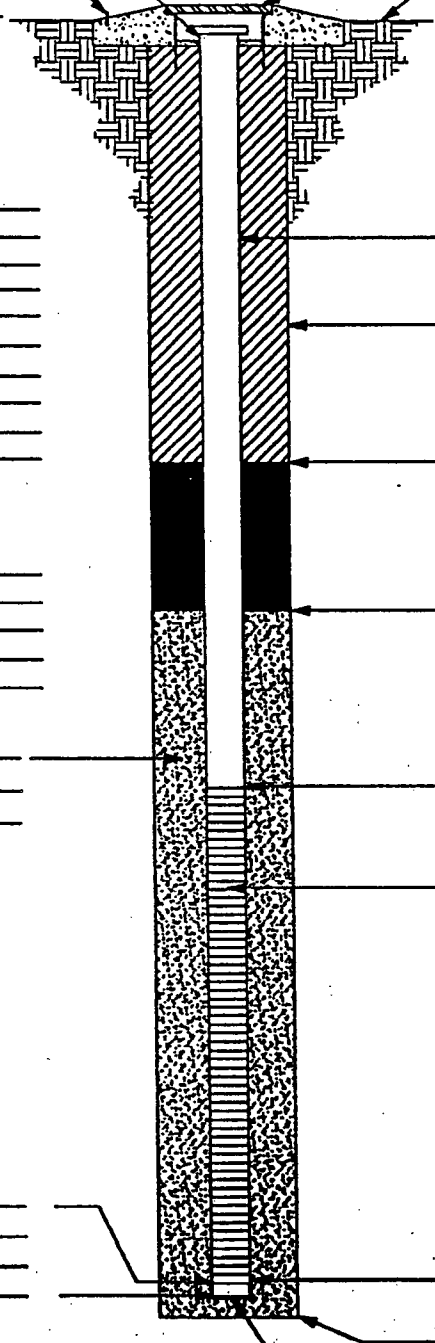
| WATER LEVEL | | | | |
|---|---|---|---|---|
| TIME | | | | |
| DATE | | | | |
| CASING DEPTH | | | | |

| DEPTH IN FEET | RECOVERY | PID READING (PPM) | DESCRIPTION OF MATERIAL | SAMPLER NUMBER | DEPTH IN FEET FROM | DEPTH IN FEET TO | COMMENTS |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

MAXIM
TECHNOLOGIES, INC.

PROJECT NAME _____
PROJECT NUMBER _____
LOCATION _____
BORING NUMBER _____
DATE _____ TIME OF CONSTRUCTION _____
PREPARED BY: _____ DATE: _____
REVIEWED BY: _____ DATE: _____

DRILLER _____ DRILLING RIG _____
DRILLING METHOD _____ TO _____
_____ TO _____
_____ TO _____



TOP OF CASING ELEVATION: _____
SURVEY PIN ELEVATION: _____
GROUND SURFACE ELEVATION: _____

MANHOLE DIAMETER: _____
SIZE CONCRETE PAD: _____

_____
FEET OF RISER _____
FEET OF SCREEN _____
HOLE COVERS _____
CAPS _____
BAGS OF SAND _____
BAGS OF BENTONITE POWDER _____
BAGS OF BENTONITE CHIPS _____
BUCKETS OF PELLETS _____
BAGS OF CEMENT _____
BAGS OF CONCRETE MIX _____

RISER PIPE I.D.: _____
TYPE OF RISER PIPE: _____
BOREHOLE DIAMETER: _____
TYPE OF BACKFILL: _____
GROUT VOLUME: _____
GROUT PLACEMENT METHOD: _____
DEPTH TO TOP OF SEAL: _____
TYPE OF SEAL: _____
SEALANT VOLUME: _____
SEALANT PLACEMENT METHOD: _____
DEPTH TO TOP OF SAND PACK: _____

DEVELOPMENT METHOD: _____
DATE DEVELOPMENT BEGAN: _____
TIME: _____
VOLUME: _____
TYPE OF CONTAINERIZATION: _____

SAND PACK MATERIAL/SIZE: _____
SAND PACK VOLUME: _____
SAND PACK PLACEMENT METHOD: _____

DEPTH TO TOP OF SCREEN: _____
CASING & SCREEN JOINT TYPE: _____
SCREEN I.D.: _____
TYPE OF SCREEN: _____
SCREEN SLOT SIZE: _____
LENGTH OF SCREEN: _____

SUMP I.D.: _____
TYPE OF SUMP: _____
LENGTH OF SUMP: _____
DEPTH TO BOTTOM OF SUMP: _____

DEPTH TO BOTTOM OF SCREEN: _____
DEPTH TO BOTTOM OF HOLE: _____
BOTTOM PLUG: _____

# APPENDIX D
# Groundwater Sampling Forms

# WATER SAMPLING FIELD FORM

Project No. _____ _____ of _____

Site Location _____

Site/Well No. MW-_____ Coded/ Replicate No. _____ Date _____

Weather _____ Time Sampling Began _____ Time Sampling Completed _____

## EVACUATION DATA

Description of Measuring Pt (MP) _____

Height of MP Above/Below Land Surface _____ MP Elevation _____

Total Sounded Depth of Well Below MP _____ Water-Level Elevation _____

Held _____ Depth to Water Below MP _____ Diameter of Casing 2 inch / 4 inch

Wet _____ Water Column in Well _____ Gallons Pumped/Bailed Prior to Sampling _____

Gallons per Foot _____

Gallons in Well _____ Sampling Pump Intake (feet below land surface) _____

Purging Equipment _____

## SAMPLING DATA/FIELD PARAMETERS

| Time | Temperature | pH | Conductivity | TDS | DO | DO% | ORP | Other |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Sampling Equipment Low Flow Pump / Disposable Bailer

| Constituents Sampled | Container Description | Preservative |
|---|---|---|
| | | |
| | | |
| | | |

Remarks _____

Sampling Personnel _____

**Well Casing Volumes**

| | | | | |
|---|---|---|---|---|
| Gal./ft. | 1 ¼" = 0.077 | 2" = 0.16 | 3" = 0.37 | 4" = 0.65 |
| | 1 ½" = 0.10 | 2 ½" = 0.24 | 3" ½ = 0.50 | 6" = 1.46 |

# APPENDIX E
# Site Contacts

## Site Contacts

| Name | Affiliation | Work Phone | Cell Phone |
|---|---|---|---|
| Kelly Blanchard | Tetra Tech, Inc. | 505-237-8440 | 505-975-2563 |
| Ana Moreno | Tetra Tech, Inc. | 505-237-8440 | 505-440-8640 |
| Gary Desselle | Tetra Tech, Inc. | 505-237-8440 | 505-288-0680 |
| Christine Matthews | Tetra Tech, Inc. | 505-237-8440 | |
| Brandon Powell | New Mexico Oil Conservation Division District 3 (Aztec) | 505-334-6178, x 15 | 505-320-0200 |
| Glen Von Gonten | New Mexico Oil Conservation Division District 4 (Santa Fe) | 505-476-3488 | |
| Bryan Nydoske | WDC Exploration and Wells District Manager | 505-865-5222 | 505-991-3578 |
| April Pohl | Envirotech Landfarm Administrator - Soil Disposal | 505-632-0615 | 505-320-6431 |
| David Brackney | Riley Industrial - Day lighting | 505-327-4947 | |
| Gregg Wurtz | ConocoPhillips San Juan Business Unit | 505-324-6194 | 505-320-2653 |
| Gwen Frost | ConocoPhillips San Juan Business Unit | 505-326-9549 | 505-215-3121 |
| Mike Mankin | ConocoPhillips PTRRC | 505-599-4098 | 505-947-8602 |
| Maxwell Blair | ConocoPhillips PTRRC | 505-599-4021 | 505-320-2732 |
| Terry Lauck | ConocoPhillips Risk Management and Remediation Site Manager | 918-661-0935 | 918-815-0556 |
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